

Chauke et al., Afr., J. Infect. Dis. (2018) 12 (2): 55-65

<https://doi.org/10.21010/ajid.v12i2.9>PROPOSED GUIDELINES TO MINIMISE MULTI-DRUG RESISTANT TUBERCULOSIS
TREATMENT DEFAULT IN A MULTI-DRUG RESISTANT UNIT OF LIMPOPO PROVINCE, SOUTH
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Article History

Received: April. 17, 2017

Revised Received: March. 19, 2018

Accepted: March. 19, 2018

Published Online: June. 18, 2018

Abstract**Background:** The increasing prevalence and incidence of Multi Drug Resistant Tuberculosis (MDR-TB) is as a result of the defaulting of treatment by patients. Worldwide, several factors that contribute to patients defaulting to tuberculosis treatment protocol have been identified. This paper aims to develop guidelines to minimise the defaulting rate of MDR-TB patients in MDR unit of Limpopo Province.**Materials and Methods:** The study was conducted using a qualitative approach. Tesch's open coding method of data analysis was adopted to analyse the data obtained. Reasoning strategies were employed in the development of the guidelines. These include analysis, synthesis, deductive reasoning and inductive reasoning. Synthesis strategy was used to construct relational statements.**Results:** The factors contributing to patients' default from MDR-TB treatment were identified and organized into four themes. Guidelines were developed to address each factor and give recommendations on possible solutions.**Conclusion:** The guidelines that were developed concluded that co-operation amongst the Department of Health, health practitioners, patient, and family members can help in preventing the defaulting of treatment.**Keywords:** Tuberculosis, guidelines, multi-drug resistant tuberculosis, patients, default**List of abbreviations:** DoH: National Department of Health, DOTS: Directly observed treatment short course, HIV/AIDS: Human Immunodeficiency Virus/Acquired Immune Deficiency Syndrome, MDGs: Millennium Development Goals, MDR-TB: Multi drug-resistant Tuberculosis, NSP: National Strategic Plan, SANAC: South African National AIDS Council, TB: Tuberculosis, WHO: World Health Organisation, XDR-TB: Extensively drug-resistant Tuberculosis**Introduction**

To date, Tuberculosis (TB) continues to be a global health problem as it is accelerated by the scourge of Human Immunodeficiency Virus/Acquired Immune Deficiency Syndrome (HIV/AIDS) epidemic. According to the World Health Organisation (WHO) 2013 TB report (2014), TB ranks as the second leading cause of death from infectious diseases worldwide, after HIV. Globally, 3.5 % of new and 20.5 % of previously treated TB cases were estimated to have had MDR-TB in 2013. The latest estimates in 2013 was that there were 9.0 million new cases and 1.5 million deaths due to TB (1.1 million among HIV negative people and 0.4 million among HIV positive) (WHO TB report, 2014).

In South Africa, TB is regarded as a top national priority as it is one of the most common causes of mortality. According to Tshitangano et al. (2015), the increasing rates of new cases of TB, MDR-TB and Extensively Drug Resistant Tuberculosis (XDR-TB) is becoming a major obstacle to achieving TB control and eradication by the year 2050 as stated by the Millennium Development Goals (MDGs) number 6 and STOP TB partnership. The South African National AIDS Council formed the National Strategic Plan (NSP) on HIV, STIs and TB 2012-2016, that aimed to half the number of new TB infections and deaths from TB through a combination of interventions (Department of Health, (DoH) 2012).

TB carries biological, social, economic and cultural implications for the patient, therefore, health care providers should be mindful of the strong impact this disease can have on all aspects of the patient's life and the need for a comprehensive approach to the management of the patient. Directly observed treatment (DOT) is an important element in the WHO recommended policy package for TB control which involves an observer watching the patient swallow the tablets, in a way that is sensitive and supportive to the patient's needs (DOH, 2004). In spite of the efforts by the government to make resources available, one of the major problems to controlling this disease is defaulting of patients from treatment (Inotu and Abebe, 2014). This is a risk which might lead to an increase in morbidity, mortality, spread of the disease and cost to control the programme (WHO, 2013).

Since the treatment period of MDR-TB is 18-24 months according to WHO, the DOH in South Africa has designed policy guidelines for a thorough management of MDR-TB. The designed policy guidelines demand that there should be a specialised management team for MDR-TB, which consist of a respiratory physician or a specially MDR-TB trained medical officer supported by a dedicated MDR-TB trained nurse, a social worker, trained counsellor and an administrative assistant (DOH, 2004).

The policy guidelines also stipulates that patients with MDR-TB should be admitted at MDR centres for at least the first four to six months or preferably until they have produced two consecutive monthly culture negative sputa. Certain patient related issues have been documented and reported by the Medical Research Council policy brief. These issues can lead to patient treatment failure, patient defaulting treatment and ultimately the development of Extreme Drug Resistant TB and death if treatment is not taken at all. The patient related issues include patient refusing hospitalization, patients discharging themselves from hospital, and infectious patients requesting discharge from hospital (DOH, 2004). Drug susceptible TB can be managed for six months at health centres, clinics, and hospitals without necessarily hospitalizing the patients unless there are other complications or if the patients are not able to take care of themselves at home (DOH, 2004).

However, under certain circumstances, some patients never complete the TB treatment course and some default their treatment leading to MDR-TB which is more difficult and expensive to treat as it requires at least four to six months of hospitalization and expensive drugs (Department of Health, 2005). Defaulting of patients to the treatment is the source of concern in the current study.

Materials and methods

Study Design

A qualitative phenomenological design was adopted in this study to explore the lived experiences of the study participants in their world (natural setting). In this study, the MDR- unit of Limpopo Province was considered the natural setting as the drug-resistant TB patients on treatment stay there during their hospitalization. The researcher used this approach to understand the experiences of MDR-TB patients during their period of hospitalization at the MDR unit.

The exploratory approach was used to explore the factors influencing defaulting of TB treatment by MDR-TB patients during hospitalization at the MDR unit and to explore the shortcomings of their MDR-TB treatment regimens. A non-probability, purposive and open sampling method was adopted to select participants among the patients who fulfilled the inclusion criteria. A pilot study was carried out with MDR-TB patients who met the criteria, but were not included in the main study.

Inclusion and Exclusion Criteria for Participants

Inclusion criteria

An eligible participants in this study must be:

- A registered MDR-TB patient on MDR-TB treatment regimen
- Admitted at the MDR-unit in Limpopo province
- Aged 18 years and above
- Willing to participate
- Have been on treatment for at least 4 months
- Available in the MDR-unit on the day of data collection

Exclusion criteria

TB patients who are not admitted in the MDR-unit in Limpopo province.

The University of Venda Health, Safety and Research Ethics Committee approved this study with the project number SHS/10/PDC/005 on 28th May, 2010.

Data Collection

Participants in the main study were interviewed individually using semi-structured interview guide in a comfortable and relaxed environment (a quiet room, with two chairs and a table) away from noise to create a good atmosphere and allow free expression of feelings. Consent was obtained from all participants. A tape recorder was used during the interviews.

During the interviews, participants were asked to explain their personal feelings, perceptions, problems, attitudes and experiences whilst on the MDR-TB treatment protocol. Questions were phrased and probed to give clarity in certain instances that were ambiguous. The participants were encouraged to speak in the language of their choice to present the true reflections of the data without distorting the information. Therefore, the original data was obtained in Sepedi, Tshivenda, Xitsonga and English languages. Translations were done to English language and presented to participants in order to confirm that the information is a true reflection of their responses during the initial interviews. Bracketing, intuiting and reflexivity were continuously reviewed to prevent bias of the researcher. Each interview lasted approximately 45 to 60 minutes. Data saturation was achieved after interviewing 17 patients and the data collection was stopped.

Data Analysis

Tesch's method of data analyses was adopted (Creswell, 1994). It involves the following steps:

- Reading through all the transcripts carefully to get a sense of the entire transcripts and jotting down ideas as they came to mind.
- Picking the interview one after another to read again and underline its themes.
- Making a list of all themes and clustering similar themes together, as well as arranging the themes into major, unique and leftover themes.
- Finding the most descriptive wording for the themes and arranging them into categories.
- Grouping themes that are related and drawing lines between categories to show relationships.
- Assembling in one place data material that belonged to each category.
- Recording existing data.
- Reaching consensus with an independent coder for data analysis.

Analysis of data revealed four central themes and several categories emerging from the central themes

Results and Discussion

The following table presents the four themes that emerge from this study.

Table 1: Themes and categories identified from data analysis

Themes		Categories	
1.	Patient factors	1.1	Substance abuse increases TB treatment interruption
		1.2	Poverty
		1.3	Socio-economic factors and boredom
2.	Cultural beliefs	2.1	Treatment interruption due to traditional and cultural beliefs
		2.2	Lack of knowledge due to religious beliefs
3.	Health care system factors	3.1	Patients' dietary needs during hospitalization
		3.2	Prolonged hospitalization in MDR unit
4.	Heath care practitioner-related factors	4.1	Inadequate health education
		4.2	Nurses' attitudes

Patient factors

Substance abuse (alcohol, cigarettes and marijuana) was found to be the most leading factor causing defaulting of TB treatment amongst TB patients. In Khayelitsha, Western Cape, Snyman et al. (2014) discovered that 21 out of 55 patients who were diagnosed with drug-resistant TB defaulted on their TB treatment due to substance abuse. This study revealed that at least 7 participants interviewed had problems with substance abuse during their TB treatment and 5 of them did not comply with their TB treatment. One participant responded as follows during the interview session:

"I was very stressed during the time I found out I had TB, and I was losing weight, when I went to the clinic they asked me to stop smoking and started me on TB treatment, but I continued drinking and smoking and I skipped taking my medicines".

In a study in Gauteng Province, Tshabalala (2007) affirms that all TB patients who were counseled and stopped taking alcohol while taking TB treatment completed their TB treatment with no complications. Thus effective TB prevention and control is possible within a substance abuse free community.

Poverty plays a role in patients defaulting treatment, especially if treatment is supposed to be taken with or after meals. A study by Tshabalala (2007) in South Africa affirmed that poverty played a role in patients defaulting their TB treatment at Tembisa clinics. Clients who were not employed and did not have sufficient food who collected treatment at Tembisa clinics were mostly diagnosed with drug-resistant TB. In this study, participants confirmed that unemployment, poverty and insufficient food played a role in their defaulting of TB treatment. Two of the participants said:

When I started taking TB treatment, I was unemployed and did not have enough food at home, which made it difficult to drink my TB treatment because after taking the tablets I will feel hungry.

I stopped taking my TB treatment because I had to leave home to start a new job in a mine in Burgersfort, when I arrive at the mine the clinic was too far and I did not have money to travel and collect my TB treatment.

According to Louw (1995), the high rate of unemployment reflected the relationship of TB with lower socio-economic conditions and may indicate that unemployed patients tend to interrupt treatment more often. Tshabalala (2007) found that feeling dizzy and nauseous after taking TB tablets on an empty stomach was one of the reasons given for abandoning TB treatment.

Socio-economic factor and boredom: The MDR unit in Limpopo Province is situated in Modimolle town of the Waterberg District serving five districts of the province; namely; Capricorn, Mopane, Sekhukhune, Vhembe and Waterberg, which has travelling implications of roughly close to 400 kilometers maximum for people from other districts to reach the MDR unit. In this study, most participants stated that they hardly received visits from their families due to the implication of travelling costs from respective communities to the MDR unit. Therefore, they experience boredom, loneliness and feeling of neglect by their families. The following response typifies this notion:

I haven't had visitors from home for some months now, and even when they visit they cannot all come as the distance from home to here is too far, sometimes only two people or one person can come to visit me once in a while, but only when they have money to travel.

According to the research study that was conducted in Cuba by Shirley (2007), inaccessible health services, including distance travelled to the health facilities by patients and their family members, contributed to patients defaulting on TB treatment due to lack of social support from significant others. Chani (2010) confirmed Shirley's findings by noting that the distance travelled and costs of travelling between patients' homes and the health care facilities contributed to many patients not returning for their monthly checkups and TB treatment, which had implications for TB treatment compliance amongst patients. Studies in the Philippines (Nichter, 1994) and Vietnam (Johansson et al., 1996) indicated that compliant behaviour is associated with social support from the family or persons of the TB patients. The importance of social support and psychosocial treatment in improving the outcomes of treatment for TB was emphasized by Liefoghe (2000). According to Love (2002), patients who live with supportive family members are more likely to complete treatment.

Cultural Beliefs

Treatment interruption due to cultural and religious beliefs: The results of this study indicate that beliefs, culture and attitudes have a great impact on the participants' view points and behavior. Most participants in this study believed that they might have contracted MDR-TB from prolonged mixed use of both anti-TB drugs and traditional herbs. Some participants elaborated that they interrupted TB treatment and started taking herbal preparations they got from the traditional healer. The following response from a participant illustrates these traditional and cultural beliefs in the context of TB:

I delayed TB treatment because I believed in traditional herbs for healing of disease, when I went to the clinic to collect TB treatment; I decided to use both the clinic treatment for TB and herbal mixtures to cure TB.

In Risenga's (2002) study of the Shangaan ethnic group, participants understood hypertension very well in their own language and others believed in the traditional healing of hypertension; she confirmed that culture and traditional beliefs plays a vital role in the way patients view their treatment. Also, in a study conducted in Mpumalanga Province in the Ehlanzeni District on factors contributing to the increased number of TB cases, it was discovered that participants ignored TB treatment due to lack of information and traditional beliefs (Selale, 2011).

Lack of knowledge due to religious beliefs: The participants in this study had various religious affiliations, thus religion had been implicated in the participants' understanding of how they were affected by MDR-TB. Since religion is regarded as an integral part of culture, illnesses such as TB and HIV/AIDS are frequently seen as a curse from God for sins committed by sufferers while witchcraft is sometimes blamed for the scourge.

The six Zion Christian Church participants in this study defaulted on TB treatment during fasting and praying, in addition others amongst the six stopped treatment because they believed in spiritual healing espoused by their church elders. The following responses from the participants during interviews exemplify this:

When I was diagnosed with TB at the clinic, I told the church and the pastors suggested I should go to Moria for praying and fasting for God's healing, that is when I default my TB medicines and nurses at the clinic told me I will take treatment for eight months instead of six months.

During the term of taking my TB treatment, I stopped taking the medicines for a while because the church people were coming to my house for praying and fasting for healing of my TB sickness from God. I believe that God could heal the TB sickness without taking TB medicines.

Health Care System Factors

South Africa is a developing country with limited resources; infrastructure within the health sector remains a major challenge in most provinces within the country, especially in rural communities. During the emergence of MDR-TB, the DoH dedicated one specialized medical unit for the management of drug-resistant TB. One unit has also been placed in Limpopo Province where this research study was conducted. However, it is still fraught with challenges such as poor infrastructure, travelling distance and dietary needs for patients hospitalized within the facility.

Patients' Dietary Needs during Hospitalization: In this study, participants' dietary needs during their term of hospitalization seem to be slightly neglected. Some participants complained that they received the same food type on a daily basis and they find the food to be less nutritive, while others felt that the hospital or MDR unit does not have sufficient food to satisfy their dietary needs. The researcher confirmed the neglect of the participants' dietary needs and proved that indeed participants received the same type of food on a daily basis when he was given permission to visit the food storage center and the kitchen where food is prepared. Two participants responded:

My main challenge is the food we receive here in this unit, they seem to prepare the same type of food for us every day, from breakfast, lunch and dinner and sometimes the food is not well prepared; at time when they serve us I lose appetite.

Eh! We are tired of receiving the same food everyday while we still have to take tablets and injections, the hospital people need to be told that they must exchange food, we can't eat rice and pap every day, sometimes they need to cook something different for us.

In a study conducted in India, lack of food was cited to be a significant factor affecting compliance to TB treatment (Pandit and Chaudhary, 2006). It was discovered that most patients found it hard to swallow TB tablets without food and that contributed to a high number of patients discontinuing TB treatment. This study further delineates the importance of providing MDR-TB patients with sufficient, nutritive and appetizing food to avoid and prevent patients from defaulting on their MDR-TB treatment.

Prolonged Hospitalization in MDR Unit: Treatment for both MDR-TB and XDR-TB in the MDR unit varies between maximum periods of 12 – 24 months of hospitalization (DOH, 1999). The drugs used in the MDR unit are injectable drugs ranging between 2 – 3 injections per day of different drugs. In addition to the period of hospitalization, the continuation phase of treatment may be shortened provided that 12 months of treatment has been given after sputum conversion by three consecutive monthly negative-culture results (DOH, 1999).

During the period of hospitalization in the MDR unit, patients are completely isolated from their normal day-to-day activities and social lives, such as going to work, attending family functions, exercising, playing sports and being with their families. Patients who are less infectious and who are showing response to MDR-TB treatment are allowed a short visit to their homes, provided a visit permission letter is issued by the managing medical practitioner. The participants expressed their dissatisfaction by saying:

The main challenge of being hospitalized here is that you don't get to see what is going on in your own house, even if there are challenges to be addressed when my family members come here to visit me they don't talk about them. You will just tell that the things are not going well at home and that worries me a lot. If they could reduce our admission here to at least a year it will be better.

You know to be honest doctor, the last time I went home it was three months back, and when I got home I was very worried that many things were not going on well, and that other people have died and were buried while I was still away, and my family is from Bolobedu, most of the time it is difficult for them to travel here to come and see me, it will be better if they allow me enough time to visit them.

Unfortunately treatment of TB is long-term with an inherent risk of patients failing to adhere to treatment, especially if the administration of the drug is not supervised. Treatment of drug-susceptible TB takes as long as six to nine months to ensure cure while using high potency combination therapy. Insufficient infrastructure to effectively treat and control the spread of TB, especially in resource poor countries, has resulted in MDR-TB that is resistant to both isoniazid and rifampicin, two of the most efficacious anti-TB drugs available.

The emergence of MDR-TB is reversing the gains made in the management of TB with MDR-TB patients being hospitalized for long durations, as the two most effective drugs are technically unavailable for these patients. Instead only expensive drugs that are toxic to the patient and less active against TB bacilli are used. Hospitalization of suspected MDR-TB patients ensures confirmatory tests are done, the patients are treated and rendered non-infectious, and the risk of disability and death due to the disease and drug toxicity minimized.

A patient-centered approach to the management of MDR-TB patients dictates that the hospitalization is kept as short as possible, according to patients' response to therapy.

Njaramba (2005) asserted that the period of hospitalization for MDR-TB had an impact on the socio-economic status of patients hospitalized at Sizwe Tropical Diseases Hospital in KwaZulu-Natal. He further discussed that the duration of hospitalization impacts on costs of health care delivery for MDR-TB patients. Thus, the duration of hospitalization of MDR-TB patients is an indicator worth reviewing.

Health Care Practitioner-Related Factors

Inadequate Health Education: The majority of participants in this study confirmed that they did not receive adequate health education about their treatment for TB from health care providers. It was clear in this study that many of the participants were mismanaged in the facilities during their drug-susceptible TB illness which resulted in the transmission of drug-resistant TB. Two participants responded as follows:

I started my treatment in 2007, and I took my treatment for TB for six months, after six months the nurses at the clinic said the treatment did not work and I should take for six months again. No one explained to me what made the medicines not to work and later I was transferred here at MDR unit because my medicine failed again.

When I arrived here at MDR unit, the nurses just told me that I will take my medicines while staying here, no one explained to me for how long and what kind of treatment I will be taking; I just realized when they started injecting me and heard other patients saying that they have been hospitalized for over a year.

Health care providers at hospital level are an essential link between the programme and the patients. They are responsible for providing treatment and maintaining registers. From a drug-resistant TB point of view, informed and motivated frontline health care workers may contribute to positive treatment outcomes. Conversely, de-motivated and ill-informed health care workers may contribute to interruptions of patients' treatment and the resulting transmission of drug-resistant TB in affected communities.

According to a study conducted by Stein (2000), non-compliance to TB treatment may result from differing interests or expectations of the patient and health care providers. Arjun (2011) affirmed that capacitating enrolled nurses and other health care providers with sufficient information and knowledge through basic MDR-TB workshops can positively contribute to the eradication of drug-resistant TB and promote positive treatment outcomes for affected patients.

Patient education during hospital admission is crucial. It is very important for the patients to understand their treatment, the side effects of the treatment and the duration of the treatment for them to comply with their treatment. Chani (2010) stated that health care practitioners have a responsibility to ensure that patients comply with TB treatment through patient education. Njaramba (2005) discovered that participants defaulted on their treatment due to side effects of the anti-TB drugs which were not explained by health care providers during treatment initiation.

Nurses' Attitudes: According to Badenhorst, Ward, and Edginton (1997), there is a tendency to hold TB patients primarily responsible for completion of treatment, but occasionally it is the unhelpful attitudes of health workers that contribute to unsuccessful treatment. Misperceptions or dissatisfaction with nurse-patient relationship may also be a cause of non-compliance. Indeed, the health care provider-patient relationship has for a long time been regarded as an important variable in compliance (Khan et al., 2000). In Pakistan, 6 out of 36 participants who defaulted TB treatment complained of the unsympathetic attitude of the health personnel (Khan et al., 2000). This study revealed some important dysfunctional aspects of attitudes of health care workers, especially some negative attitudes of nurses towards participants:

At times I feel like not taking my medicine and leave this place and go home because of the way other nurses treat me. Other nurses look at me with hatred and I don't know what I did to them. Sometimes when they give us medicine their attitude is very bad, they treat me like I am nothing or I am some kind of a disease, but people are different I understand.

In a study conducted in New Zealand, Miller (2007) indicated that nurses' perceptions and attitudes towards TB patients played a vital role in 90% of patients who completed their TB treatment. It was observed that a display of a caring attitude by nurses towards patients create an environment where patients understood the importance of taking their treatment regularly and completing their therapy.

Arjun (2011) conducted a study in Kwazulu-Natal - in an MDR unit similar to the Limpopo MDR unit in this study - on the experiences of enrolled nurses caring for MDR-TB patients. The findings from the study indicated that although the enrolled nurses had limited knowledge of MDR-TB, had fears of contracting the disease and had less knowledge about the disease treatment, their positive attitudes towards patients promoted treatment completion amongst MDR-TB patients they cared for. It was observed that the enrolled nurses cared for the patients and that there was a good nurse-patients relationship.

A similar case of good nurse-patients relationship to ensure that patients complete their TB treatment will be that of a directly observed treatment short course (DOTS) supporter and a TB patient. DOTS strategy was developed to ensure that patients are supported by a significant someone to complete their TB treatment. Unfortunately, in an MDR unit there are no DOTS supporters for MDR-TB patients and the nurses resumed the responsibility and role of supporting the patients to complete their treatment. In this study, participants felt that nurses had negative attitudes towards them which made them feel less supported by the nurses. Thus, effective MDR-TB prevention, control and management are possible within a positive attitude environment with sufficient health care providers that have enough knowledge and capacity to manage the drug-resistant TB disease.

Development of Guidelines

The methods of Mackay (1969) called reasoning strategies were used to develop the guidelines as adopted by Tshitangano et al. (2015). These strategies include analysis, synthesis, deductive reasoning and inductive reasoning. The analysis strategy employed Tesch's (1994) open coding method of data analysis described in Creswell (2009) to identify guideline concepts and their attributes. The synthesis strategy was used to construct relational statements. Deductive reasoning strategy permitted the authors an opportunity to make logical predictions in the form of assumptions based on the literature reviewed. The inductive reasoning strategy was used to draw conclusions in the form of a hypothesis.

The Goal of the Guidelines

The guidelines will assist the MDR-TB patients with coping strategies which will reduce their chances of defaulting treatment. The guidelines aim to devise an effective way of making the MDR-TB treatment a success and reducing the number of defaulters.

Guideline Concepts

Chauke (2014) identified the following factors as concepts of the guidelines:

- 1.1. Substance abuse increase TB treatment interruption.
- 1.2. Treatment interruption due to traditional and cultural beliefs.
- 1.3. Lack of knowledge due to religious beliefs.
- 1.4. Distance travelled.
- 1.5. Poor MDR unit infrastructure.
- 1.6. Patients' dietary needs during hospitalization.
- 1.7. Prolonged hospitalization in MDR unit.
- 1.8. Poor patient management.
- 1.9. Nurse attitudes.

Relational statements

When the concepts were compared, four relationships were established between them namely:

1. Patient related factors- substance abuse was found to be the most leading factor causing defaulting of TB treatment amongst TB patients
2. Cultural beliefs- it was observed that participants often placed strong focus on their cultural roots and this affected their understanding of TB, its transmission, and the benefits of a planned treatment schedule
3. Health care system related factors- there is only one unit that has been placed in Limpopo province, however it still poses a lot of challenges
4. Health care practitioner and nursing care related factors- attitude and mismanagement of patients due to lack of knowledge can contribute to an increasing number of defaulters

Guideline assumptions

The guidelines assume that if the factors that influence defaulting of MDR-TB treatment are dealt with, then the rate of defaulting will be low thereby reducing deaths, accelerating the recovery of patients and also reducing further spread of the disease. With the anticipation that these guidelines are carefully followed, there will be a reduction in the number of cases of defaulters.

Guideline structure

According to Dickoff et al. (1968), in order to design the structure of the guidelines, six elements of practice theory were adopted which are: context, agent, recipient, dynamic, procedure, and the terminus.

The **context** refers to the hospital which is the MDR Unit of Limpopo

Agents refer to unit managers and TB control managers who will implement the guidelines.

Recipients of guidelines are the hospital personnel and patients who will be affected by the implementation of the guidelines.

The **dynamics** identified for this guideline from data analysis include:

1. Patient related factors.
2. Cultural beliefs
3. Health care system related factors.
4. Health care practitioner and nursing care related factors

The **protocols** governing the developed guidelines were national and international TB control policies and guidelines namely:

- The WHO (2009) policy on TB infection control;
- The South African national TB control programme practical guidelines (DOH 2004);
- The management of MDR-TB (DOH 2012a);
- The national infection prevention and control policy for TB, MDR-TB and XDR-TB part 1 & 2 (DOH 2007);
- The MDR-TB policy framework on decentralised and deinstitutionalised management for south Africa (DOH 2011);
- The 2012-2016 national TB strategic plan (DOH 2012b); and
- The TB infection control guideline (DOH 2010).

The **terminus** of the guideline is to reduce the number of defaulters to MDR-TB treatment.

Guidelines to minimize the defaulting rate of MDR-TB treatment at MDR unit

The guidelines are based on the results of the investigation into the factors that contribute to defaulting of treatment by MDR-TB patients and the short coming of the MDR-TB treatment plan. The guidelines will be presented in view of the identified themes of the study, the findings of the study and the proposed guidelines to improve the current situation will be presented (Chauke, unpublished dissertation 2014). Relevant literature control was done to verify the results of the study.

Patient related factors

Results of the study related to patient related factors revealed that at least 40% of the patients interviewed had problems with substance abuse during the time they were on TB treatment. It was revealed that alcohol, cigarette smoking and marijuana/dagga are forms of substances most people use in Limpopo province including participants in the study. The study reveals that patients use the substances in order to cope with boredom and loneliness and also as a form of entertainment.

Guidelines based on patient related factors

- Nurses and social workers as well as designated lay counsellors should work together in thorough counselling of all newly diagnosed MDR-TB patients prior to the commencement of treatment. Counselling of clients should include an HIV test and should be focused on the importance of completing TB treatment and the effects of substance abuse during the duration of tuberculosis treatment.
- Family members of the patients and their significant others should be involved in assisting the patients abstain from alcohol and other abusive substances during the course of MDR-TB treatment. These include nurses and DOT supporters working together in supporting the patients.
- It is recommended that support groups for all newly diagnosed MDR-TB patients who are known to abuse substances be formed in health care facilities. According to the study conducted in Free State, support groups for HIV and TB increase treatment success rate in primary health care facilities (Dingie van Rensburg et al, 2009).

Cultural beliefs

Individuals commit to engaging in behaviour from which they anticipate personal valued benefits. In the study, cultural, traditional and religious beliefs affected participants' correct knowledge of tuberculosis and its treatment. The results of the study related to cultural beliefs revealed that patients interrupted their tuberculosis treatment due to cultural beliefs.

Guidelines based on cultural beliefs

- It is recommended that the Department of Health's TB section should identify and establish a relationship with traditional healers and leaders; and religious affiliations to educate patients about tuberculosis and the importance of completing and complying with TB treatment course.
- The department of Health should establish a referral system with traditional healers, to enable referral of all TB patients from traditional healers to the nearest primary health care facility.
- Department of Health should create radio and media slots that advertise TB services in primary health care as well as educate the people about the importance of completing TB treatment.

Health care system related factors

- The results of the study revealed that few health care systems related factors contributed to TB patients defaulting their TB treatment and non-compliance.
- In this study, 80% of the patients complained of the distance between their homes and the MDR unit, which in their own opinion resulted in the inability for their family members to frequently visit them.
- 50% of the participants suggested that the MDR unit should have entertainment facilities such as television sets with DSTV components to reduce the boredom, and 30% of the participants complained of repeated diet schedules on a daily basis as well as poor infrastructure which can lead to cross infection between MDR and XDR patients.

Guideline based on health care system related factors

- It is recommended that the government should re-launch the DOT strategy and implement integration of DOT strategy into both TB and HIV services to ensure that patients comply with the TB and ARV treatments.
- Department of Health should initiate supervision of MDR unit services by the provincial TB directorate as opposed to district primary health care directorate.
- Family members should be allowed adequate visitation of the patients, to allow patients to socialize with their significant others.
- It is recommended that patients who are less infectious and more compliant with their treatment should be allowed visitation periods to their homes whilst they are still on treatment; doctors managing the patients should approve the periods with referral letter to the nearest clinic as well as treatment for the period of home visit. However, care should be taken to ensure that patients who are given such a privilege have clinics near their homes and DOT supporters who will supervise their compliance while at home.
- It is recommended that patients should be thoroughly counselled prior to admission at an MDR unit, with an emphasis on the period of stay to ensure that they understand the need for their prolonged stay at MDR unit.
- The MDR unit should review their patients' dietary needs on a weekly basis, consultation with a dietician should be done and patients' concerns should be taken into serious consideration.

Health care practitioner and nursing care related factors

- Health care practitioners play an important role in the treatment process of patients. Nurses play far more important roles than any other health care practitioner as they spend all day and night with patients.
- Health care practitioners also play a role in assisting patients complete their treatment; however negative attitudes, maltreating of patients, and lack of counselling skills and thorough knowledge of the management of drug resistant tuberculosis, may have had an adverse effect on patients' treatment outcome. It is crucial that health professionals caring for MDR-TB patients play a role in implementing change and any guidelines or policies that will assist in the better MDR-TB treatment outcomes in sustaining the lives of those affected.

Guidelines based on health care practitioner and nursing care related factors

- It is recommended that all MDR unit health care practitioners should be thoroughly trained on the management of MDR-TB and an update short course to be done at least once every year.
- Nurses in MDR unit should be trained on counselling skills; this will enable them to be able to conduct counselling sessions with clients on a regular basis.

- It is recommended that health care education sessions should be done daily in the MDR unit, the importance of completion of tuberculosis treatment should be a daily health care education to MDR-TB patients.
- Patients' concerns and complaints should be taken into serious consideration. There should be a complaint and suggestion box in the MDR unit which must be reviewed on a monthly basis and all complaints must be addressed accordingly.
- Behavior modifications should be encouraged in the MDR unit amongst patients and nurses. Negative attitudes by nurses towards patients should be discouraged. Nurses should render a holistic care and approach towards patients.

Conclusion

The developed guidelines concluded that co-operation amongst the Department of Health, patient, health practitioner and other stake holders can help in preventing or at least minimizing the defaulting of treatment.

Recommendations

Authors recommend that health care workers at the MDR unit should intensify health education, infection control practices and healthcare administration.

Acknowledgement

Authors thank the Research and Publications Committee of the University of Venda for funding the study, University of Venda Health, Safety and Research Ethics Committee for approving the study with the approval number SHS/10/PDC/005, University of Venda Higher Degrees Committee and the Provincial Department of Health for approving the study, and the participants for agreeing to partake in the study.

Conflict of Interest: Authors declare that there is no conflicting interest.

Author participation: Chauke, Netshikweta and Netshandama conceptualised the paper and collected data. Nyathi and Tshitangano analysed the data and drafted the manuscript. Olaniyi edited the manuscript for submission to the journal.

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